

**Translation**

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>TPTC0007</b>	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. <b>PCT/EP2004/001855</b>	International filing date (day/month/year) <b>25.02.2004</b>	Priority date (day/month/year) <b>25.02.2003</b>
International Patent Classification (IPC) or national classification and IPC <b>G02F 1/383</b>		
Applicant <b>TOPTICA PHOTONICS AG</b>		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☒ (sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:

☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) \_\_\_\_\_, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input checked="" type="checkbox"/>	Box No. VII	Certain defects in the international application
<input checked="" type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/001855

Box No. I

Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-10 \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the claims:
- nos. \_\_\_\_\_ as originally filed/furnished
- nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- nos.\* 1-14 \_\_\_\_\_ received by this Authority on 18.12.2004 with the letter of 16.12.2004
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the drawings:
- sheets 1/1 \_\_\_\_\_ as originally filed/furnished
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/001855

Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	1-14	YES
	Claims		NO
Inventive step (IS)	Claims	1-14	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-14	YES
	Claims		NO
2. Citations and explanations (Rule 70.7)			
<p>1. The documents cited in the International Search Report are referred to here as documents D1 to D4.</p> <p>1.1 Document D1 (Herrmann J. et al., "Experimental Evidence for Supercontinuum Generation by Fission of Higher-Order Solitons in Photonic Fibers", Appl. Phys. Lett. 88(17), 173901-1 to 173901-4, 2002) is considered to be the prior art closest to the subject matter of claim 1. D1 discloses (see in particular figures 1 and 2 and page 173901-2) a device for generating light impulses in the visible range of the spectrum, comprising a laser system (figure 1 (b): "Ti:sapphire oscillator") which emits light pulses measured in femtoseconds in the infra-red range (page 173901-2, top of right-hand column: "[P]ulses centered at 850 nm ... with pulse durations of ... 100 fs"), and also comprising an optical frequency converter (PCF) for converting the wavelength of the light pulses in the visible range (Ib.: "The spectra generated in the fibres covered the range up to 350-1600 nm"). The wavelength of the light pulses emitted by the laser system is tunable (page 173901-2, bottom of left-hand column: "... to adjust the wavelength of radiation ..."), and an optical stretcher (PCF) is provided so that the pulse duration of the frequency-converted light</p>			

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

pulses can be increased to at least 1 ps (figure 2(d) shows the "pulse shapes after propagation through the fibre" (bottom of left-hand column on page 173901-3); the resulting light pulses are longer than 1 ps)).

- 1.2 Assuming that the term "light pulses measured in femtoseconds" is defined as covering only light with a pulse duration of less than 1 ps (see Box VIII below), the subject matter of the claim differs from the known device in that the wavelength of the light pulses emitted by the laser system is converted so that the wavelength of the converted light pulses is tunable in the visible range of the spectrum.
- 1.3 The subject matter of claim 1 is therefore novel (PCT Article 33(2)).
- 1.4 The problem addressed by the invention can thus be seen as that of making the wavelength of the converted light pulses tunable.
- 1.5 If this assumption is made, the subject matter of claim 1 also involves an inventive step (PCT Article 33(3)) because there is nothing in the available prior art to suggest to a skilled person how the aforementioned problem might be solved.
- 1.6 Claims 2 to 13 are dependent on claim 1 and therefore also meet the PCT requirements in respect of novelty and inventive step. The use of the claimed device can also be considered inventive.

**Box No. VII      Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

2.    Contrary to the requirements of PCT Rule 5.1(a)(ii), the description does not cite document D1 or give an account of the relevant prior art disclosed therein.
  
3.    Claim 1 is drafted in the two-part form, but the feature whereby the wavelength of the light pulses emitted by the laser system is tunable should not have been placed in the characterising part of the claim because it is disclosed in document D1 together with the features set out in the preamble (PCT Rule 6.3(b)).

**Box No. VIII** Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

4. The application fails to meet the requirements of PCT Article 6 for the following reasons:

4.1 Any period of time can be expressed in femtoseconds, and so the term "light pulses measured in femtoseconds" in claim 1 is vague because it covers light pulses of any duration.

4.2 For the purposes of the examination it is assumed that what is meant is light pulses with a duration (FWHM?) of less than 1 ps, although the claim is not limited in a way that indicates this.